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Combined and General Staff Officer Course Student Evaluation of the Tactical Planning Workstation

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The Tactical Planning Workstation is an automated system that supports Army tactical staff performance at the division level. It was developed in the Experimental Development, Demonstration, and Integration Center at the U.S. Army Research Institute Fort Leavenworth Field Unit as a platform for prototyping staff information and decision aids and conducting research on staff performance. See Flanagan and Fallesen (in preparation) for a description of the capabilities of the system and Packard, McClanahan, Zarse, and Ross (in preparation) for a software description. This paper documents an evaluation of the Workstation that was conducted to obtain preliminary feedback from potential users on key design features. Students of the Command and General Staff Officer Course (CGSOC) at Fort Leavenworth provided data for the evaluation. The students made favorable comments about the ease of use of the Workstation, especially when compared with the Maneuver Control System interface.

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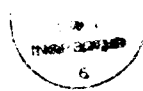# FOR THE BEHAVIORAL AND SOCIAL SCIENCES

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COMMAND AND GENERAL STAFF OFFICER COURSE STUDENT EVALUATION OF THE TACTICAL PLANNING WORKSTATION

CONTENTS

COMMAND AND GENERAL STAFF OFFICER COURSE EVALUATION OF THE TACTICAL PLANNING WORKSTATION

Introduction

The Tactical Planning Workstation is an automated system to support Army tactical staff performance at the division level. It was developed within the Experimental Development, Demonstration, and Integration Center at the Army Research Institute Ft. Leavenworth Field Unit as a platform for prototyping staff information and decision aids and conducting research on staff performance. See Flanagan and Fallesen (in preparation) for a description of the capabilities of the system and Packard, McClanahan, Zarse, and Ross (in preparation) for a software description. This paper documents an evaluation of the Workstation that was conducted to obtain preliminary feedback from potential users on key design features of the Workstation. Students at the Command and General Staff Officer Course (CGSOC) at Ft. Leavenworth provided data for the evaluation.

Background

The students made their evaluation assessments as part of their Command and General Staff Officer Course, Advanced Command and Control Elective, A399. This 30 hour elective was developed to provide an instructional environment for students to learn the capabilities of the Maneuver Control System (MCS); to determine the requirements, potentials, and shortfalls of integrating MCS into the CGSOC curriculum; and to review and evaluate the MCS software and provide feedback to the combat development community. The demonstration they received of the Tactical Planning Workstation was part of a three hour block of instruction devoted to observing demonstrations of computer systems other than MCS. The Tactical Planning Workstation served as a comparison system to MCS. The instructors compiled the student MCS assessments into a report on problems and recommendations (subject: After action report, Advanced C2 Elective; dated 2 Jun 89) that was provided to the MCS TRADOC System Manager (TSM) for resolution. For ARI, the student comments about the Workstation and completed questionnaires provided user feedback for an evaluation of the Workstation interface.

Evaluation Method

During 17 to 18 May 1989, eighteen Command and General Staff College students were given a half hour demonstration of the Tactical Planning Workstation and an opportunity to use it. They were then asked to respond to a questionnaire on the Workstation and asked for verbal comments. Eight people filled out the questionnaire. This paper summarizes students' verbal comments and questionnaire responses.

Not all of the students observing the demonstrations completed a questionnaire. Eight of the 18 students did fill one out. The questionnaires were completed on a volunteer basis. Most of those not complying with the

request to complete the questionnaire made verbal comments about the interface. The non-respondents to the questionnaire may have seen no additional value in completing it; felt they did not fully understand the capabilities sufficiently to rate them; not wanted to take the time to complete the questionnaire before their next class; or have not been favorably impressed and so made no written comment.

Results of the Questionnaire

Appendix A shows the questionnaire items and the Mean, Median, and Standard Deviation for each applicable item.

The students generally rated the Workstation very easy to use. The situation data and reference data menus, walking menus, map features and task organization all received a mean rating on ease of use of 4.8 on a scale of 1 (hard to use) to 5 (easy to use).

Of the map features, the grids and contours, respectively, were rated first and second most useful by all but one student. For map background features, shaded relief, vegetation, and elevation handling were rated equally useful. On the map scales, 1:80,000, 1:160, 000, 1:400,000, and 1:800,000 were ranked first through fourth in terms of usefulness. One student commented that the usefulness of the map scales depends on the planning level (e.g., division or corp). The ratings of the usefulness of the various tactical overlay features varied considerably, "Show BLUEFOR Units" was rated most useful, and "Show OPFOR Control Measures" was rated the least useful.

Verbal Comments

One interviewer was present to record comments and the following represents only a sample of the verbal comments of the students.

Comparison to the Maneuver Control System (MCS)

Students were very favorably impressed with the ease of use of the Workstation, especially when compared to MCS. Typical comments were "Compared to MCS, this is Christmas!" and "An absolutely outstanding interface. We must incorporate this into MCS." One student commented that he liked to be in control of what's displayed on the screen. In MCS the system controls what is shown. One student thought that the busy light was a useful feature - in MCS it was difficult to tell if the computer is processing material.

Ease of Learning

The students thought the Workstation was very easy to learn. However, in the half hour instruction time, not all the features were shown, and the students might have found features not shown harder to learn. Students thought it was important to have an interface that could be self taught rather than requiring 90

hours to learn (a reference to the duration of the program of instruction for MCS). The students felt that officers have enough to do without having to learn a complicated skill and then maintain it, especially a very perishable one. One student said he was often frustrated with MCS because he could not remember the correct commands.

Walking Menus

Several students commented that it would be more natural to click on a selection rather than having to hold the mouse button down. Some students had a tendency to let up on the mouse button and have the menu disappear inadvertently. Several thought the walking menu would be hard to use under conditions of stress and fatigue because of the fine motor coordination required.

These verbal comments do not seem to be consistent with students' questionnaire ratings of the walking menu as "easy to use". (See question 7 in Appendix A). It may be that students thought the walking menu was easy to use, but that their suggestions would make it even easier to use. Another explanation for the discrepancy is that the questionnaire item may be ambiguous to the students. The item asks "How easy was it to use the walking menus to request displays and perform actions?" This could be perceived as two different questions: (1) How easy was it cognitively to request displays? and (2) How easy was it physically to perform the actions? Students could have been responding to the first part of the question. In any case, it appears that students thought the walking menu was not difficult to use, but that it could be improved.

Scrolling

Students generally liked the scroll technique and thought it was better than the one on MCS. Some had a hard time getting in the correct scroll band. One student suggested that using keys to scroll would be easier than using the mouse, especially under conditions of fatigue and time stress when "the motor coordination is the first thing to go."

Map Scales

Several students said the map scales should be standard ones rather than the non-standard scales available on the Workstation. They thought otherwise they would not be able to print graphic overlays to fit standard maps. However, they did not realize that a map printed by the system could be scaled differently than the scale of the display.

Information Retrieval

Students thought the Workstation allowed easier access to information than MCS. The walking menus did not require students to remember what was in the data base. One said this was important because soldiers under pressure should not be required to remember detailed instructions. However, several

commented that the organization of the data base (Flanagan and Fallesen, in preparation) by FM numbers would be more natural and easy to use than the current system.

Mouse Buttons

There was some confusion about when to use each of the three mouse buttons.

Task Organization Tool and Status Tool (TOAST)

TOAST is a staff aid which graphically displays the current task organization of friendly units. Using the mouse, users can graphically change the task organization or obtain detailed or primary status information on any unit. Students thought these features would be especially useful in tactical planning.

Suggestions for Improvement

One student suggested the addition of an automatic warning if unit strength fell below 70%. In general, he felt the system should be designed using a "management by exception" orientation to planning. Another said that the term "Build" to label the Build window did not mean anything to him. A more descriptive term should be used. One student suggested that drawing control measures should be done with a continuous line, (the same as some MacIntosh drawing capabilities), not point to point.

Summary

Students made favorable comments about the ease of use and ease of learning of the Workstation, especially when compared with the MCS interface. Students especially liked the minimization of memory requirements for Workstation operation. They showed some confusion about when to select from the right mouse button or the left, and they thought the walking menu might be hard to use under conditions of fatigue, stress and MOPP 4. Suggestions for improvement included using keys to scroll a window and clicking on menu selections rather than having to hold the mouse button down.

References

Flanagan, J. P., & Fallesen, J. J. (in preparation). Tactical Planning Workstation functional description. ARI Research Product.

Packard, B. J., McClanahan, L., Zarse, R. T., & Ross, G. G. (in preparation). Tactical Planning Workstation software description. ARI Research Product.

Interface Questionnaire Showing Means, Medians, and Standard Deviations (SD)
of Questionnaire Scores

Name: _____

HUMAN-MACHINE INTERFACE EVALUATION (EDDIC)

Below are a series of questions concerning your impressions of using the Sun workstation for COA analysis.

1. How well are the Situation Data and Reference Data Menus labeled and organized for easy and logical access to data (please circle the appropriate number in the rating scale below)?

1	2	3	4	5	
Hard to use		OK		Easy to use	Mean = 4.8 Median = 5 SD = .4

2. For the purpose of conducting a COA analysis, are the map background, map scale, map features, and tactical overlay laid out in an operationally logical manner so you can find the information you want quickly (please circle the appropriate number in the rating scale below)?

1	2	3	4	5	
Hard to use		OK		Easy to use	Mean = 4.8 Median = 5 SD = .4

Please specify the areas you feel need improvement. If possible, please suggest improvements.

3. In each of the map display categories below, please rank order the individual attributes from one (1) for the most useful attribute, to four (4) for the least useful attribute (1 - 6 for the Map Features category).

SD	Median	Mean	MAP FEATURES	SD	Median	Mean	MAP SCALES
.4	1	1.1	Grids	.4	1	1.2	1 : 80,000
.4	2	1.9	Contours	.5	2	1.8	1 : 160,000
1.0	3	3	Roads	.5	3	3.2	1 : 400,000
1.2	4	3.9	Hydrography	.5	4	3.8	1 : 800,000
1.1	4	4.1	Built-up Areas				
0	6	6	Misc. Features				TACTICAL OVERLAY

SD	Median		MAP BACKGROUND	SD	Median	Mean	
				1.0	1	1.6	Show BLUEFOR Units
				.9	2	1.9	Show BLUEFOR Control Measures
1.1	3	2.1	Shaded Relief				
.6	2	2.0	Vegetation	1.3	2	2.4	Show OPFOR Units
.7	2	1.7	Elevation Banding	1.3	2	2.7	Show OPFOR Control
0	4	4.0	None				Measures

4. Are the labels for the map display categories in question 3 above consistent with terminology used by Army personnel?

    YES   NO   All said yes

    If NO, please circle some of the worst offending labels in the list in question 3.

5. While identifying Critical Events, was it easy to enter CEs in the tactical overlay using the Sun workstation?

    YES   NO   N/A

    If NO, explain the problem.

6. How easy was it to coordinate the use of both the Sun and Symbolics workstations while identifying Critical Events (please circle the appropriate number in the rating scale below)?

1	2	3	4	5	
Difficult	Somewhat Difficult	Somewhat Easy	Easy	Very Easy	N/A

    If rated (1) or (2), explain the problem.

7. How easy was it to use the "walking" menus to request displays and perform actions (please circle the appropriate number in the rating scale below)?

1	2	3	4	5	
Hard to use		OK		Easy to use	Mean = 4.8 Median = 5 SD = .5

8. How easy was it to use the Task Organization tool to review and modify the task organization, and obtain updated unit status (please circle the appropriate number in the rating scale below)?

1	2	3	4	5	
Hard to use		OK		Easy to use	Mean = 4.8 Median = 5 SD = .5